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SEMEN ISAAKOVICH VOL'FKOVICH

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In 1946, S. I. Vol'fkovich completed 50 years as an Academician.

Since 1939, when the Department of Chemical Science, Academy of Sciences USSR was organized, he has been the Deputy Academician Secretary of the department. He also was the scientific director of the Scientific Research Institute for Fertilizers and Insectofungicides (NIUIF), in which he has worked for more than a quarter century.

The scientific and pedagogical activity of Vol'fkovich started in 1920. He was one of the first to insist on cooperation between the proponents of theory and the proponents of practice. As a result, he has been very helpful in organizing various scientific research projects, practical plant design, and in building the chemical industry of the USSR in general, as well as in pedagogical and scientific organizational work.

With respect to his scientific research work, it is necessary to mention his many researches in connection with development of new chemical technological processes in the fields of phosphoric, nitric, potassium, fluoride, sulphur, and boric compounds. Vol'fkovich is constantly attempting to find new ways for using USSR raw-material resources. It was as a result of his studies that the first USSR full-scale production electric furnaces for the electrothermic distillation of phosphorus from domestic phosphorites were constructed at the Chernorokursk Chemical Combine. In 1931, the Committee on Chemicalization of the Peoples' Economy of the USSR, awarded Vol'fkovich the Prize imeni Mendeleyev for his work on phosphorus and phosphates.

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Vol'fkovich, together with V. P. Kamzolkin, developed a new method for the acid processing of phosphorites involving treatment with a mixture of sulphuric acid and ammonium sulphate. This process was then used in production of the concentrated fertilizers ammonophosphate, both binary and enriched, as well as superphosphate, sulphate of ammonium, and calcium nitrate. Vol'fkovich and his collaborators developed several methods for total conversion of phosphates with nitric acid, with end production of phosphate fertilizers, fluorides, and rare earths.

In 1941, Vol'fkovich, V. I. Loginov, and A. M. Polyak were given the Stalin Prize for developing this process, whereby nitric acid is used for decomposition of phosphates with formation of nitrate fertilizer as an additional end product. Vol'fkovich was one of the first to study utilization of fluorine gases, which were obtained as a result of the decomposition of natural phosphates by sulphuric acid. These researches were conducted in connection with studies on production of superphosphates. In some of his work he investigated the alkaline decomposition of phosphate by the heating of phosphorites and apatites at temperatures of 1000 to 1200 degrees with soda and sodium sulfate, carbon, lime, and other materials. These products are known as thermophosphates.

In 1930, Vol'fkovich introduced a variation of the work, which had been started by Prof. P. P. Fedot'yev, in connection with the conversion of sodium sulphate with ammonia and carbonic acid into soda and ammonium sulphate. Fedot'yev had considered this process useless and too costly, but Vol'fkovich in his laboratory was able to improve the methods so that they were quite useful. He concluded that they were applicable for the treatment of naturally occurring mirabilite. In this work, Vol'fkovich was aided greatly by his assistant A. P. Belopolskiy.

As a result of these experiments, a special nitrogen fertilizer and soda plant was designed. During 1926 and 1927, much of Vol'fkovich's work was on the technology and chemistry of potassium salts, in connection with the discovery and development of large deposits of native potassium salts at that time. As a result of his work, Vol'fkovich was named a member of the Potassium Commission of VSNKh.

In 1927, he studied German, French, and other foreign technology for processing potassium salts. He designed the first Russian plant for production of potassium chloride from sylvinit and devised several new methods in that field. He was also the first to publish in Russian a monograph on the technology of potassium salts.

In 1932, Vol'fkovich developed an economical method for producing boric acid from the low-grade datolites found in the Northern Caucasus. He selected treatment with sulfuric acid for the conversion, thus forming the basis on which L. Ye. Berlin and others were able to develop a further refinement of the method leading to its industrial acceptance. The successful treatment of low-grade boron minerals, which were discovered in 1934 and 1935 in the Inderskiy region, can be attributed to the work done by Vol'fkovich.

Generally, the boron resources of the USSR are inadequate. Therefore, Vol'fkovich attempted to devise methods for obtaining boron from the boron-containing petroleum waters by precipitation in the form of insoluble boric salts. The NIUPI is currently conducting research along this line.

In addition to perfecting many chemotechnological methods, Vol'fkovich has also done much research in the field of inorganic chemistry and the physicochemical analysis of technological processes. In one of his works, which he published under the title of "Hygroscopicity of Ammonium Nitrate," he described processes of crystallization and the physicochemical properties of ammonium nitrate.

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Vol'fkovich was the first to initiate studies of the crystallization cycle and topochemical reactions with the use of cinematographic exposures through a microscope. One of his first published works in this field dealt with the processes of crystallization of nitrates, particularly ammonium nitrate. He also conducted thermographic and roentgenographic studies of various modifications of this salt, and was able to discover a new crystalline modification of ammonium nitrate.

Vol'fkovich spent much time studying the physicochemical conditions of the oxidation of sulphites. During World War II, Vol'fkovich and his collaborators conducted a series of investigations on the chemistry of phosphorus sulphides. On the basis of physicochemical analyses, they developed a method for obtaining nonhydrolyzable phosphorus sulphides which were stable at high as well as low temperatures, and which were completely safe even after long storage and during transportation.

His method, which was developed in cooperation with B. V. Illarinov and M. N. Stepanov, is being used in Soviet plants producing nonhydrolyzable sulphur-phosphorus compounds. Vol'fkovich, with R. E. Remen, developed a tensiometric method for high-speed determination of the hydrolytic stability of phosphorus sulphide.

Vol'fkovich also occupied himself with physicochemical analyses of processes of chemical technology in connection with the absence or insufficiency of equilibrium, kinetic, thermochemical, crystallochemical and other data illustrating the theoretical fundamentals of processes for obtaining mineral salts. M. L. Chepelevetskiy at NIUIF continued these studies.

One of Vol'fkovich's best-known and most highly regarded works in his two-volume "General Chemical Technology," which was compiled with the aid of D. A. Epshteyn, K. M. Malinin, A. P. Yegorov, and others. These volumes comprise a text which describes typical flowsheets of the principal technological processes, conditions surrounding utilization of basic physicochemical regularities in chemical technology, and uses of raw materials and power.

Vol'fkovich substituted for A. N. Bakh in developing the scientific organizational work for the chemical institutes, Academy of Sciences USSR. With his associates, he was responsible for publication of several special instruction books in the field of technology, i.e., "The Technology of Nitrogen Fertilizers," "The Technical Processing of Potassium Salts," (this work was awarded a prize at the All-Union Congress of the TsEKVBU) and "The Mineral Resources of the Basic Chemical Industry."

In all his 26 years of scientific and pedagogical activity, Vol'fkovich was very closely affiliated with the development and progress of the USSR chemical industry. Just about every fertilizer plant is in some way indebted to Vol'fkovich, because he was either consulted in its design or participated in development of a new technological process. For many years, he was deputy chairman, Technical Council for the Chemical Industry, and a member of the Committee on Chemicalization of the Peoples' Economy, Council of Peoples' Commissars USSR. Recently he has become a member of the Technical Council, Ministry of Chemical Industry, and a member of the Council of Scientific-Technical Expert Aid, Gosplan, USSR. During World War II, he was also a member of the Scientific Technical Council, Peoples' Commissariat for Defense in which he was a department chief.

No description of Vol'fkovich is complete without mentioning that for a long time he has been a member of the Presidium of the All-Union Chemical Society imeni D. I. Mendeleev. He was a deputy to the Moscow Council and has also served in many other elected positions, for example, the Presidium of the All-Union Scientific Research Technical Society of Chemists, Section

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of Scientific Workers, etc. During World War II, he was responsible for development of new methods for production of military materials. He also recommended many ways for improving the operation of then-existing plants. One of Vol'fkovich's most noteworthy accomplishments was his cooperation in building the Khibinsk Apatite-Nephelene Combine, which produces fertilizers out of apatite, and the Solikamsk Potassium Combine.

Since 1920, Vol'fkovich has been very active in the educational field. He is responsible for such courses as "The Physical Chemical Basis of Chemical Technology," "Basic Designs and Computations for Chemical Technological Processes," and has initiated a new laboratory course of general chemical technology. Due to his pedagogical activity at the Institute of Social Economy imeni Plekhanov, the Moscow Higher Technical School, the Military Academy of Chemical Defense imeni K. Ye. Vorshilov, and in various courses for improving qualifications of chemical engineers, the Soviet chemical industry and universities now have many excellent instructors and practitioners. For his many achievements, Vol'fkovich has been awarded the Order of Lenin, the Order of Labor Red Banner, in addition to other awards already mentioned.

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